OPR 3001

Rugged Handheld Laser Scanner

OPTICON

Specifications Manual

All information subject to change without notice.

Document History

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1. Abstract

This manual provides specifications for the OPR 3001 handheld laser barcode scanner.

2. Overview

The OPR 3001 is a rugged handheld laser barcode scanner with protection against dust and splashing water to ensure reliable operation in harsh environments. The OPR 3001 is enclosed in a rugged housing sealed to IP-54 standards that withstands repeated drops of up to two meters onto concrete.

Short-wavelength red laser beams enhance the visibility of scanning lines for easier aiming under adverse lighting conditions. The OPR 3001 is available in USB, RS-232C, and Wedge interfaces.

Supported symbologies:

- JAN/UPC/EAN/all add-on

- Codabar/NW-7, including ABC and CX

- Chinese Post Matrix 2 of 5

- Code 39: Normal Code 39 / Full ASCII Code 39 / Italian Pharmaceutical

- Code 11

- Code 93

- Code 128: EAN-128

- IATA

- Industrial 2of5

- Interleaved 2of5

- ISBN-ISMN-ISSN

- Korean Postal Authority code

- Matrix 2of5

- MSI/Plessey-UK/Plessey

- RSS: RSS-14 (incl. CC-A/B) RSS-Limited (incl. CC-A/B)/ RSS-Expanded (incl. CC-A/B)

- Composite Codes: UCC/EAN-128 (incl. CC-A/B/C)

- S-Code

- Telepen

- Tri-Optic

- PDF417

- MicroPDF417

3. Physical Features

3.1. Dimensions

W 68 X D 150 X H 155 mm (except protruding portion)

3.2. Weight

230 g max (excluding cable).

4. Environmental Specifications

4.1. Operating Temperature and Humidity

Temperature: -10 to +60° C

Humidity: 5 to 90% RH

4.2. Storage Temperature and Humidity

Temperature: -30 to +70° C

Humidity: 5 to 90% RH

4.3. Ambient Light Immunity

Decoding performance is guaranteed when the range of illumination on a barcode surface is between zero and the following values:

Incandescent light	to 4,000 lx
Fluorescent light	to 4,000 lx
Sunlight	to 80,000 lx
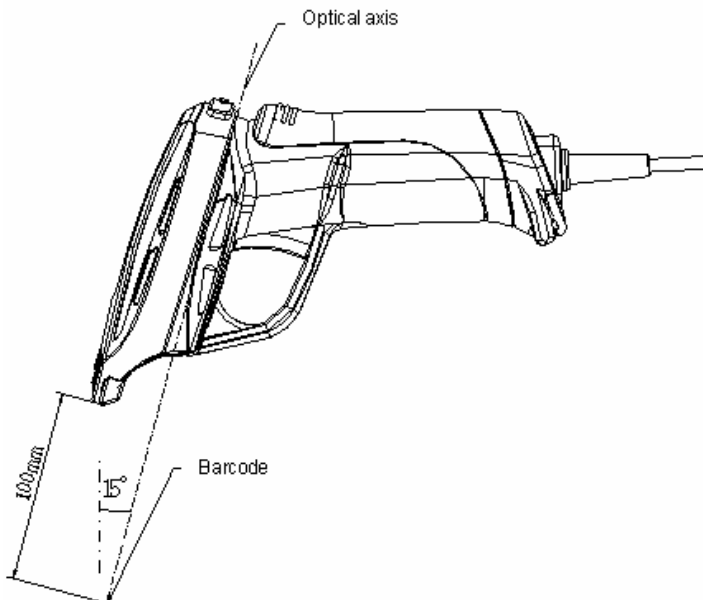
Figure 1: Ambient light immunity

Conditions

Barcode Sample: OPTOELECTRONICS Test Sample

PCS:	0.9
Resolution:	0.25 mm
Symbology:	9-digit Code-39
Quiet Zone:	10 mm
N/W Ratio:	1:2.5
Distance:	100 mm from the edge of scanner
Angle:	$\alpha = 0°$ $\beta = 15°$ $\gamma = 0°$
Curvature:	$R = \infty$
Power supply voltage:	6.0 V

Direct light or specular reflection light from a source should be prevented from entering the acceptance area.

5. Electrical Specifications

5.1. Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Power supply voltage		5.4	6.0	6.6	V	RS-232C
		4.5	5.0	5.5	V	USB and Wedge
Operating current	I_{OP}	-	96	130	mA	RS-232C when emitting
		-	90	125	mA	USB and Wedge when emitting laser
Rush current	I_{PEEK}	-	400	600	mA	RS-232C
		-	300	500	mA	USB and Wedge
Stand-by current	I_{PRE}	-	35	60	mA	RS-232C
		-	30	55	mA	USB and Wedge

Conditions:

- Connect 1Ω resistance to a power supply line in series and measure the current by the voltage between both ends of resistance.

- Power supply voltage is measured at a connector terminal area.

- The current value depends on the host computer to which the device is connected.

6. Optical Specifications

6.1. Laser Scanning Specification

Parameter	Specification	Unit
Light-emitting Element	Red laser diode	-
Emission Wavelength	650 ±10 (25° C)	nm
Light Output	1.0 or less	mW
Scanning Method	Bi-directional scanning	-
Scanning Speed	100 ±20	scans/s
Scan Angle	Scan angle: 54 ±5	°
	Effective scan angle: 44 (Min)	°

6.2. Laser Scanning Standard

6.2.1. Laser Scanning Tilt

Laser scanning tilt is the vertical difference between both ends of a laser scan line. Measure it in the middle of the laser scan line.

- Up to 1.2 degrees angle in vertical direction from the scan origin (mirror motor).

- Up to 3.1 mm at 150 mm from the scan origin.

6.2.2. Scanning Curvature

The maximum difference between the laser scan line and the line between both ends of the laser scan line. Measure it in the middle of the laser scan line.

- Up to 1.27 degrees angle in vertical direction from the scan origin (mirror motor).

- Up to 3.3 mm at 150 mm from the scan origin.
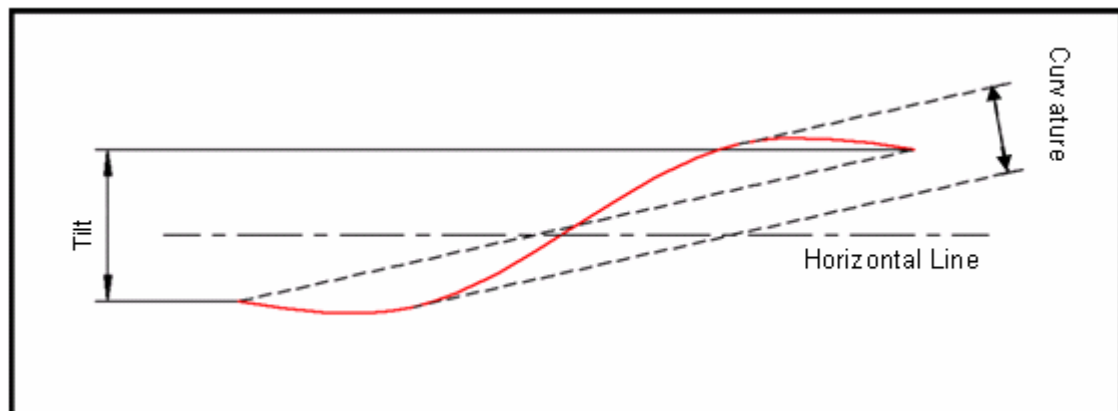
Figure 2: Laser scanning tilt and curvature

7. Technical Specifications

The conditions for technical specifications are as follows, unless otherwise specified in each section.

Conditions

Ambient Temperature and Humidity	21º C/70º F, 60% RH
Ambient Light	500 to 900 lx
Background	Barcode = black
	Space = white
	Margin = white
	Background of label = black
Power Supply Voltage	6.0 V (RS-232C) / 5.0 V (USB and Wedge)
Decoding Test	Approve the performance when decoding is successful in all ten tests.
	(Decoding is deemed successful when completed in 0.5 second or less.)

7.1. Print Contrast Signal (PCS)

0.45 or higher (over 70% of reflectivity of space and quiet zone).

7.2. Scan Area and Resolution

The depth of field is measured from the edge of the scanner. The scanning range is within the circular arc centered on the scan origin.
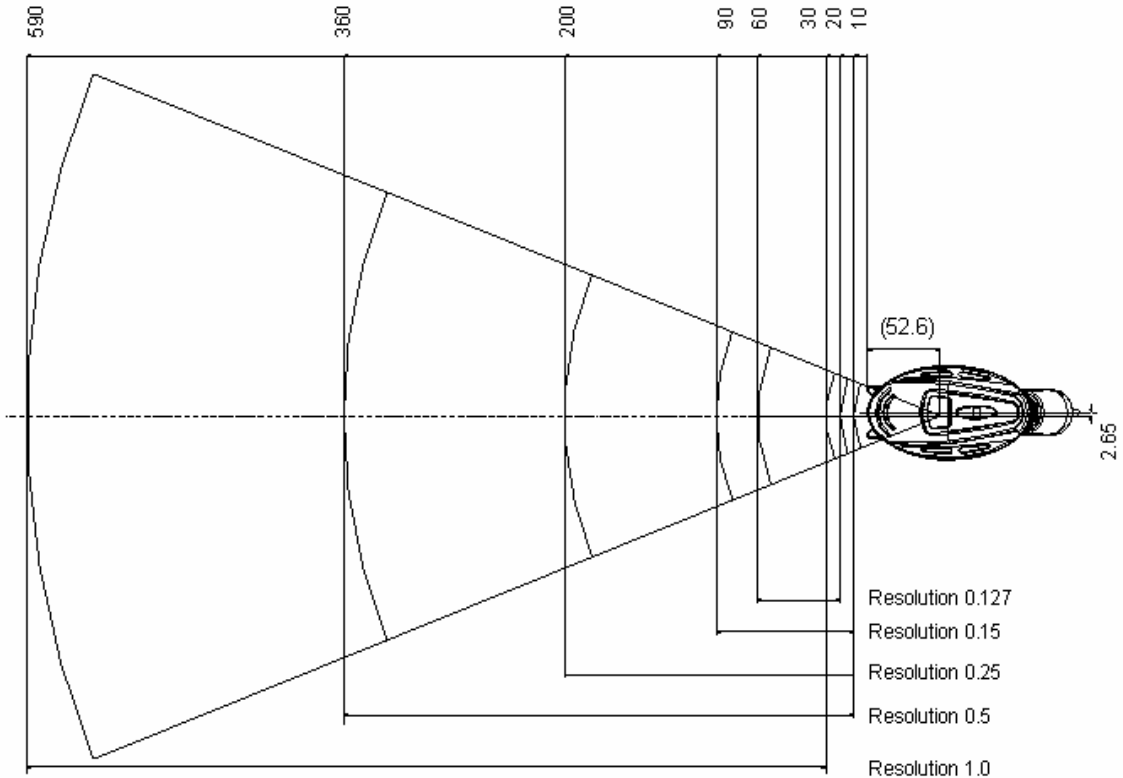
Figure 3: Scan area and resolution (in mm)

Resolution	Symbology	PCS	Quiet Zone	Digit	Decode depth (mm)
1.0 mm	CODE-39	0.9	25 mm	1	30 - 590
0.5 mm	CODE-39	0.9	18 mm	3	10 - 360
0.25 mm	CODE-39	0.9	10 mm	8	10 - 200
0.15 mm	CODE-39	0.9	7 mm	10	10 - 90
0.127 mm	CODE-39	0.9	5 mm	4	20 - 60

Conditions:

Barcode Sample: OPTOELECTRONICS Test Sample

N/W Ratio: 1:2.5

Angle: $\alpha = 0°$, $\beta = 15°$, $\gamma = 0°$

Curvature: $R = \infty$

7.3. Pitch, Skew, and Tilt

7.3.1. Pitch Angle

α = ±35°
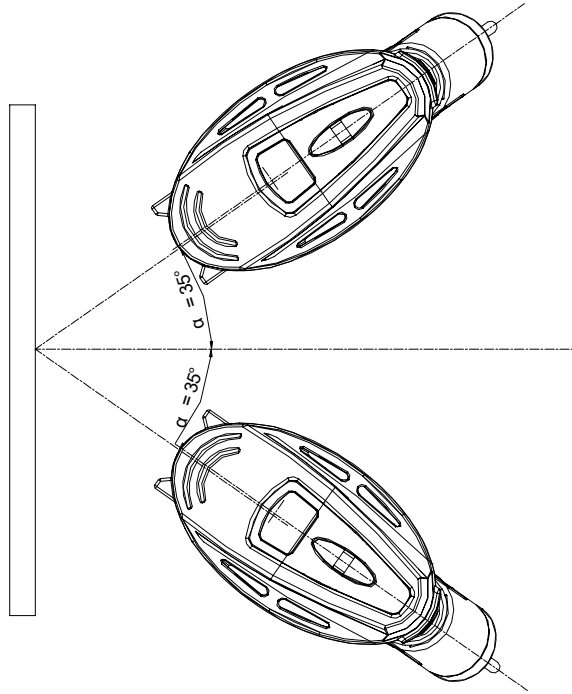
Figure 4: Pitch

7.3.2. Skew Angle and Dead Zone

Skew angle: β = ±50° (Excluding dead zone)

Dead zone: β = ±8° (There are some areas in which decoding fails due to specular reflection)
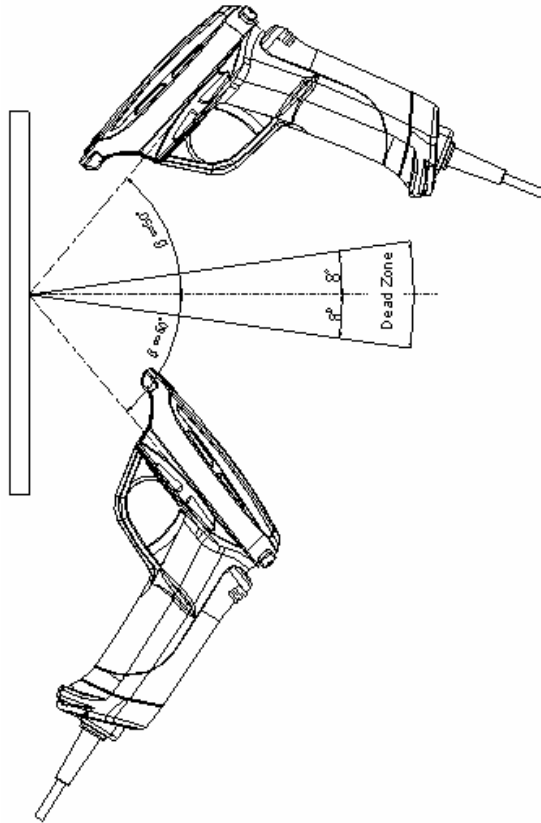
Figure 5: Skew angle and dead zone

7.3.3. Tilt Angle

γ = ±20°
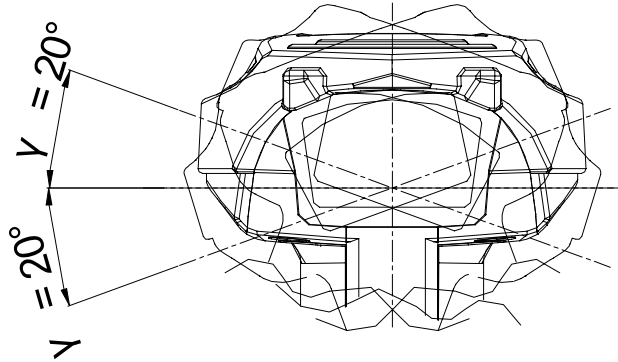
Figure 6: Tilt angle

Conditions

Barcode Sample: OPTOELECTRONICS Test Sample

Distance:	60 mm from the edge of the scanner
Label:	**Pitch Angle, Skew Angle, Dead Zone**
	PCS = 0.9, Resolution = 0.25 mm, Symbology = 9-digit Code-39, Quiet Zone = 10 mm
	N/W Ratio = 1:2.5
	Tilt Angle
	PCS = 0.9, Resolution = 0.26 mm, Symbology = 13-digit JAN, Quiet Zone = 10 mm
Angle:	**Pitch Angle:** Skew Angle β = +15°, Tilt Angle γ = 0°
	Tilt Angle: Pitch Angle α = 0°, Skew Angle β = +15°
	Skew Angle, Dead Zone: Pitch Angle α = 0°, Tilt Angle γ = 0°
Curvature:	R = ∞

7.4. Curvature

With 8-digit JAN/UPC/EAN barcodes, decoding performance is guaranteed when R≥15 mm.

With 13-digit JAN/UPC/EAN barcodes, decoding performance is guaranteed when R≥20 mm.
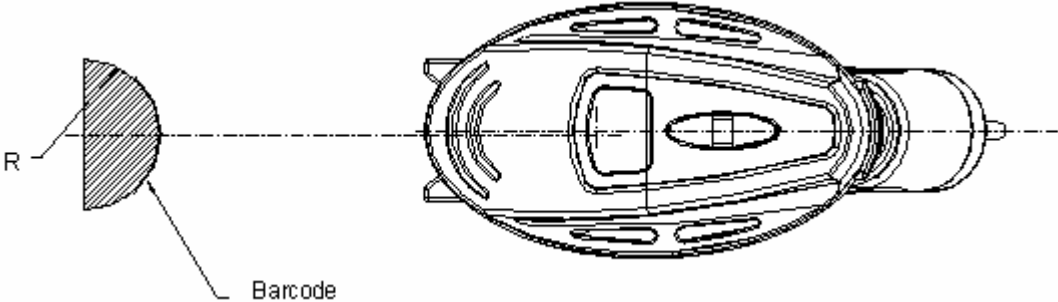
Figure 7: Curvature

Conditions

Barcode Sample: OPTOELECTRONICS Test Sample

PCS = 0.9, Resolution = 0.26 mm, Quiet Zone = 10 mm	
Distance:	60 mm from the edge of the scanner
Angle:	Skew Angle β = +15°

8. Interface Specifications

8.1. RS-232C Interface Specification

8.1.1. Settings and Communication

Reading menu barcodes [ZZ] + [U2] + [ZZ] can set the RS-232C interface default.

Item	[U2] setting
Baud rate	9600 BPS
Start/stop bits	1 bit
Data bits	8 bits
Parity bits	No parity
Handshaking	No handshake
Flow Control Time Out	Indefinitely

- You can change the communication condition using the menu barcode.

8.1.2. Signal Level

Signal Name	I/O	RS-232C Level (V)	
		Mark/OFF	Space/ON
TxD	OUT	-5 to -15	+5 to +15
RxD	IN	-3 to -15	+3 to +15
RTS	OUT	-5 to -15	+5 to +15
CTS	IN	-3 to -15	+3 to +15

8.1.3. Interface Circuit

Figure 8: Interface circuit

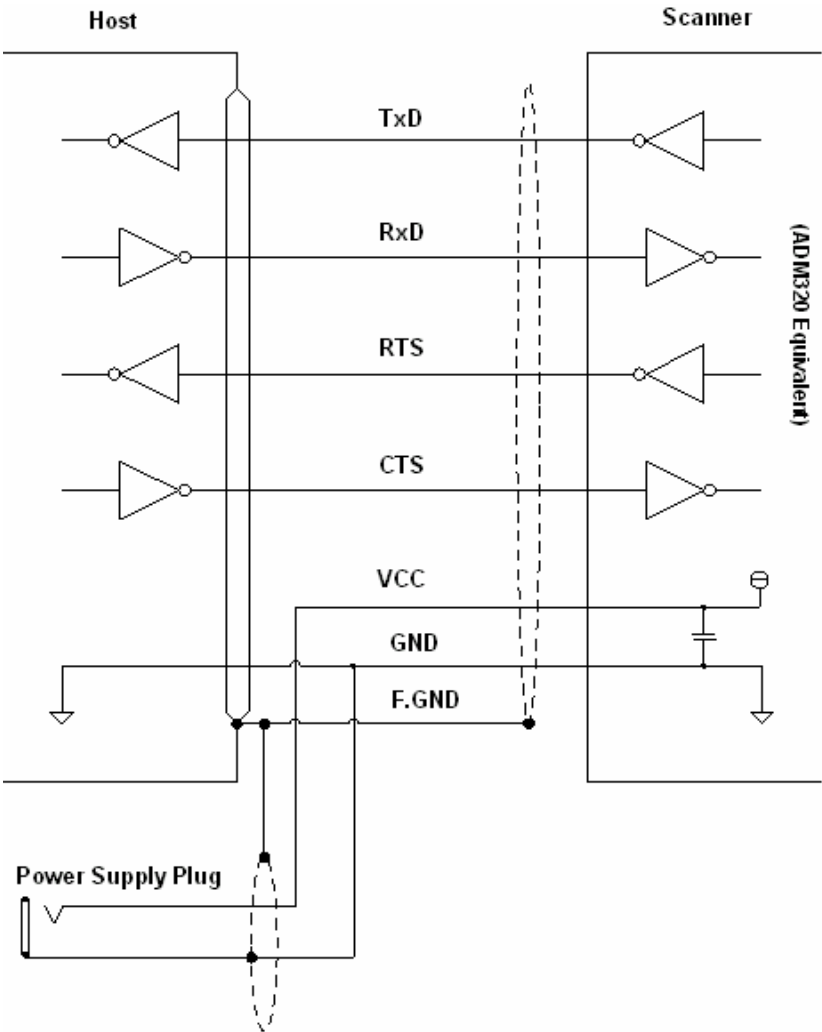### 8.1.4. Character Format
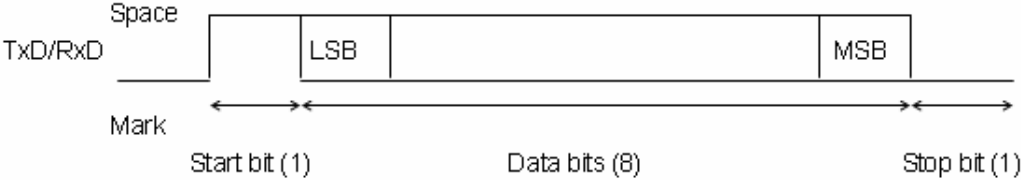
Figure 9:Character format (same for both sending and receiving)

8.1.5. Communication Format
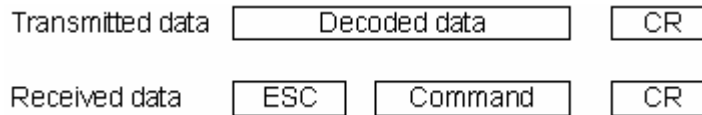
Figure 10: Communication format

8.1.6. Handshaking

Select handshaking options using the menu or command listed below.

Handshaking	Menu/Command
No handshake	P0
BUSY/READY	P1
MODEM	P2
ACK/NAK	P3
ACK/NAK NO RESPONSE	P4

a) No Handshaking

The scanner attempts the communication regardless of the state of the host computer.
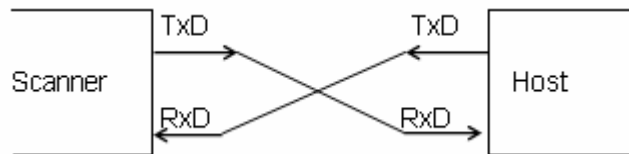
Figure 11: No handshaking

b) BUSY/READY

The scanner and the host computer notify each other of their state and whether they can receive data with BUSY/READY through an RTS line. They can communicate state to each other through a CTS line when connected as in the following figure.
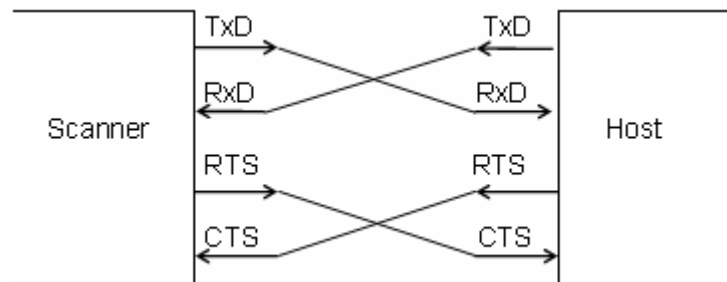
Figure 12: Busy/Ready communication

The scanner stays ON (is able to receive data) except during certain parts of the process, such as receiving data (buzzer command execution), transmitting data, and menu processing. The scanner checks the CTS line before transmitting data. When it is ON, the scanner transmits data. When it is OFF, the scanner waits for it to turn ON within a set time. The scanner will abort transmission with an error indication (buzzer) when the CTS line is not ON within a specified period. The Flow Control time-outs are as follows, and the default setting is "indefinitely" (I0).

Flow Control Time Out	Menu/Command
Indefinitely	I0
100 ms	I1
200 ms	I2
400 ms	I3
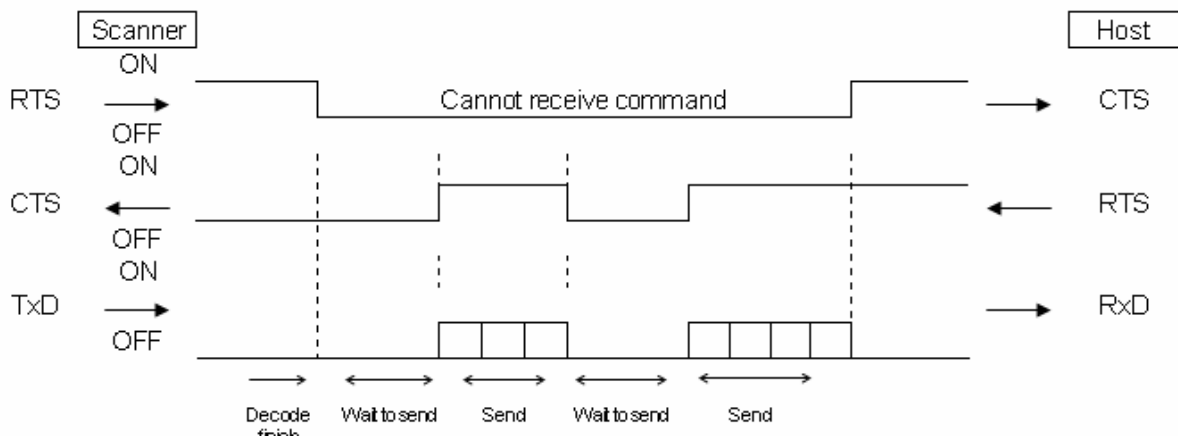
Figure 13: Cannot receive command

CTS, TxD signal timing

When the CTS line is turned OFF while sending a TxD signal, the scanner transmits one character and waits.
When the RTS signal is turned ON while transmitting a character, the character will be transmitted.

Figure 14: Signal timing

Note: When using loopback (wire connection) for CTS, RTS line of the scanner in this setting,
No handshake is not enabled.

c) MODEM

The scanner turns CS line ON before transmitting data. Other processes are the same as BUSY/READY.
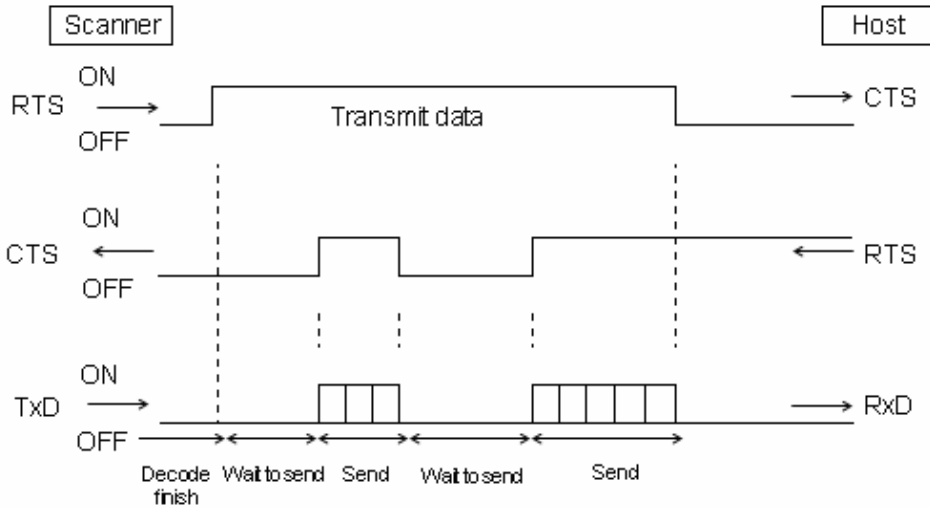
Figure 15: Modem transmit data

d) ACK/NAK

After data has been transmitted, the scanner expects to receive one of the following responses from the host:

- *ACK* response—Action: The scanner completes transmission with the good-read buzzer and returns to the initial state.

- *NAC* response—Action: The scanner sends the data again and waits for the response from the host.

- *DC1* response—Action: The scanner returns to waiting for the trigger, if it has a trigger (the initial state).

- *None* response—Action: The scanner sounds the error buzzer and returns to the initial state.

ACK/NAK timeout can be set as follows using the menu or commands.

ACK/NAK timeout	Menu / Command
Indefinitely (default)	XI4
100 ms	XI5
500 ms	XI6
1000 ms	XI7

Figure 16: ACK/NAK

e) ACK/NAK NO RESPONSE

When no response from the host is received within the setting time, the scanner assumes an ACK response, and returns to the initial state without the error buzzer. The other actions are the same as ACK/NAK.
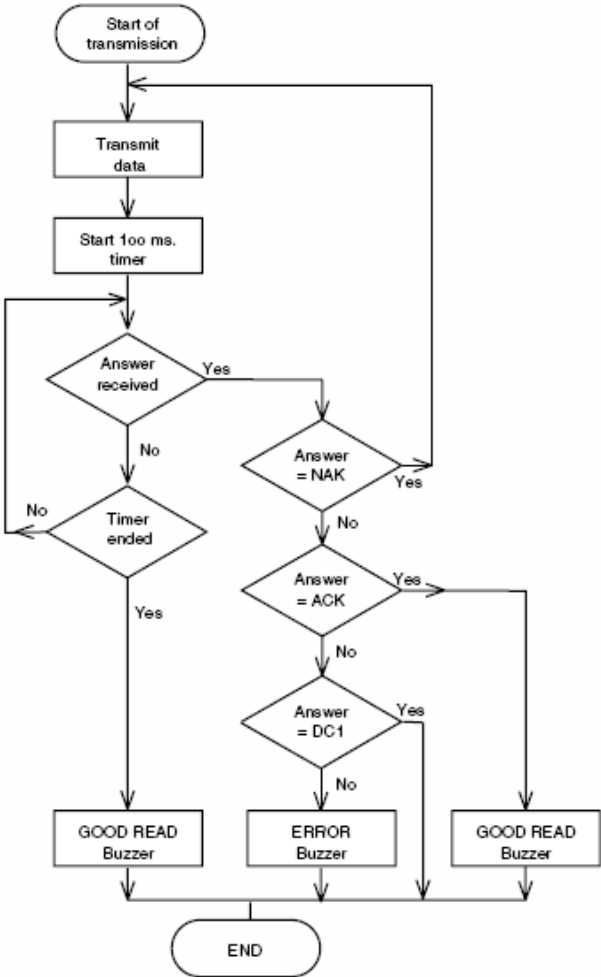
Figure 17: ACK/NAK—No response

8.2. USB Interface Specification

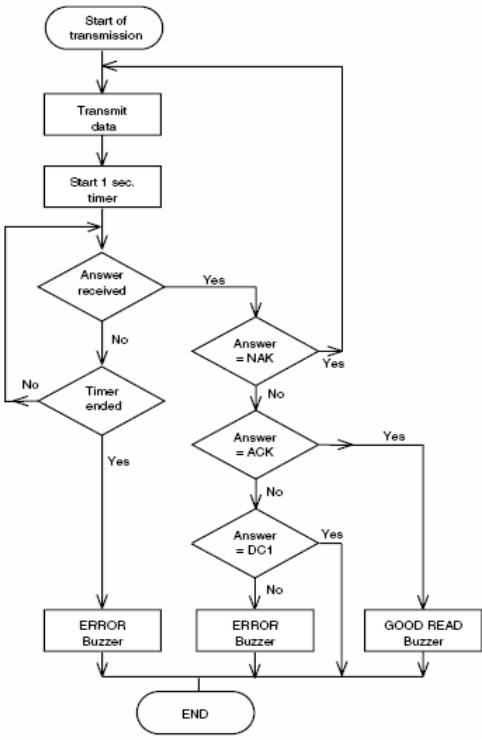### 8.2.1. Settings and Communication

Reading menu barcodes [ZZ] + [SU] + [ZZ] can set the USB interface default.
The OPR 3001 USB model uses a full-speed USB interface.

8.2.2. Interface Circuit
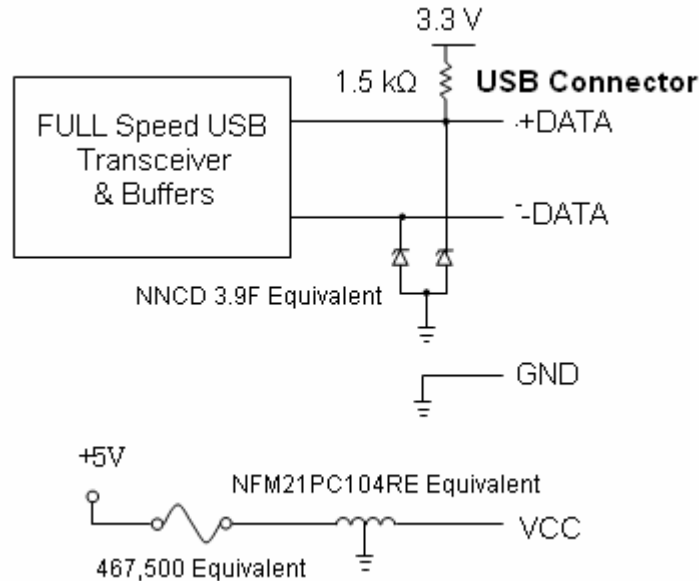
Figure 18: USB interface circuit

Do not operate the keyboard while the scanner is transmitting the data to the host; it may cause data transactions to fail.

8.3. Wedge Interface Specification

8.3.1. Settings and Communication

a) **With desktop PC (using external keyboard)**

Reading menu barcodes [ZZ] + [UB] + [KM] + [ZZ] can set the DOS/V Wedge interface default.

b) **With notebook PC (not using external keyboard)**

Reading menu barcodes [ZZ] + [UB] + [KL] + [ZZ] can set the DOS/V Wedge interface default.

Do not operate the keyboard while the scanner is transmitting the data to the host; it may cause data transactions to fail.

9. Cable and Connector

9.1. Cable Specifications

9.1.1. RS-232C Cable

(Standard specification)

| Type:	Straight
Diameter:	Φ4.8 ±0.5 mm
Length:	1500 ±50 , -0 mm
Cores:	8 insulated wires, 1 conductive wire
Weight:	Approximately 80 g
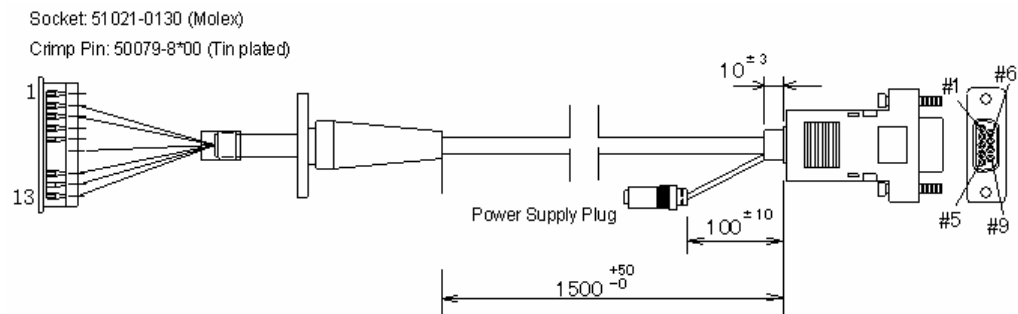
Figure 19: RS-232C cable

a) Pin Assignment

Pin No	Signal Name	Notes
1	NC	Open (not assigned)
2	TXD	
3	RXD	
4	---	Pin no. 6 and jumper
5	GND	
6	---	Pin no. 4 and jumper
7	CTS	
8	RTS	
9	NC	Open (not assigned)

Connector: A connector with a plug for external power supply (D-sub, 9-pin, female)

Power Supply: φ4.0 (inside diameter: φ1.7)

Exterior electrode of the plug is GND and interior electrode is +.

9.1.2. USB Cable

(Standard specification)

Type:	Straight
Diameter:	Φ4.8 ±0.5 mm
Length:	1500 ±50, -0 mm
Cores:	4 insulated wires, 1 conductive wire
Weight:	Approximately 60 g
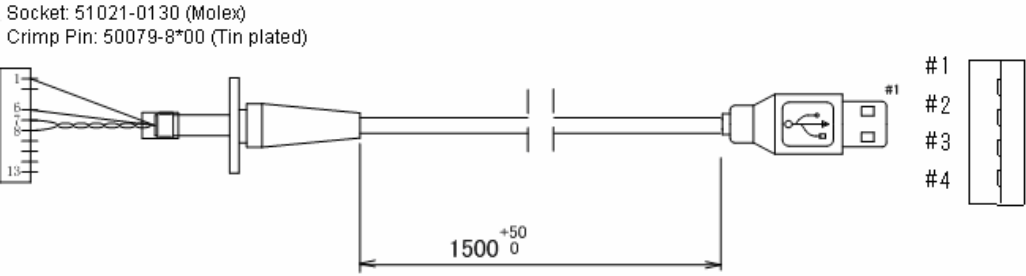
Figure 20: USB cable

a) Pin Assignment

Pin No	Signal Name
1	VCC
2	-DATA
3	+DATA
4	GND

9.1.3. Wedge Cable

(Standard specification)

Type:	Y cable
Diameter:	Φ4.8 ±0.5 mm
Length:	1500 ±50 , -0 mm
Cores:	8 insulated wires, 1 conductive wire
Weight:	Approximately 80 g
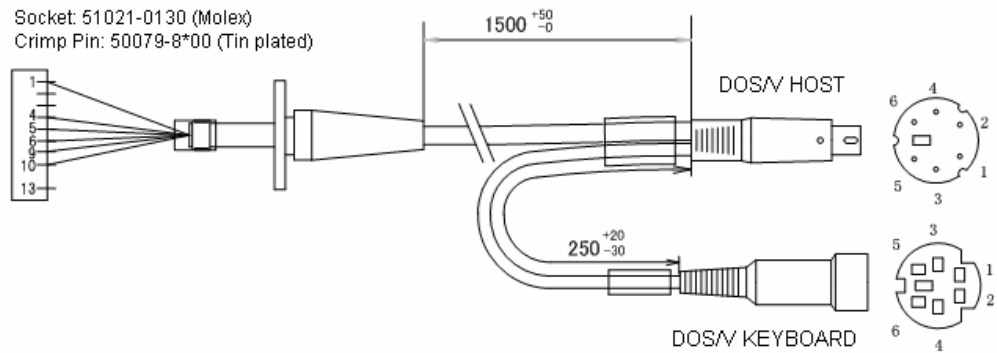
Figure 21: Wedge cable

a) Pin Assignment

DOS/V Host Side			DOS/V Keyboard Side	
Pin No	**Signal Name**		**Pin No**	**Signal Name**
1	CPU_DATA		1	KEY_DATA
2	---		2	---
3	GND		3	GND
4	VCC		4	VCC
5	CPU_CLK		5	KEY_CLK
6	---		6	---

9.2. Scanner Connector Specification

CN801 (13-pin)

Pin Number	Signal Name		
	RS-232C	USB	Wedge
1	NC	VCC	VCC
2	R×D	NC	NC
3	T×D	NC	NC
4	NC	NC	CPU_CLK
5	NC	NC	CPU_DATA
6	GND	GND	GND
7	NC	USB+	NC
8	NC	USB-	NC
9	NC	NC	KB_DATA
10	NC	NC	KB_CLK
11	CTS	NC	NC
12	RTS	NC	NC
13	VCC	NC	NC

10. Readable Barcodes

10.1. Menu Barcodes: Default Settings

Default menu barcodes set the scanner to factory defaults.

RS-232C Default

Functions	Menu labels	Menu codes
SET	Z Z	ZZ
RS-232C	U 2	U2
Single tone buzzer: 3 kHz*	W 1	W1
Buzzer duration: 50 ms*	W 7	W7
Read mode options: Single read*	S 0	S0
END	Z Z	ZZ

* If you are using software version TS01Y04 or later, it is not necessary to configure the foregoing settings.

USB-HID Default

Functions	Menu labels	Menu codes
SET		ZZ
USB default		SU
END		ZZ

Wedge Default (with external keyboard)

Functions	Menu labels	Menu codes
SET		ZZ
AT Wedge default		UB
Keyboard layout: with keyboard		KM
END		ZZ

Wedge Default (without external keyboard)

Functions	Menu labels	Menu codes
SET		ZZ
AT Wedge default		UB
Keyboard layout: without keyboard		KL
END		ZZ

10.2. Default Settings 1: Readable Codes

Code type	Reading	Transmit Code Length	Transmit CD	Calculate CD	Prefix	Suffix	Transmit Other
UPC-A	■	X	■	■	-	CR	
UPC-A Add-on	X	X	■	■	-	CR	
UPC-E	■	X	■	■	-	CR	
UPC-E Add-on	X	X	■	■	-	CR	
EAN-13	■	X	■	■	-	CR	
EAN-13 Add-on	X	X	■	■	-	CR	
EAN-8	■	X	■	■	-	CR	
EAN-8 Add-on	X	X	■	■	-	CR	
Code-39	■	X	■	X	-	CR	Not transmit ST/SP
Code-39 Trioptic	■	X	■	X	-	CR	Not transmit ST/SP
NW-7 (CODABAR)	■	X	■	X	-	CR	Not transmit ST/SP
Industrial2of5	■	X	■	X	-	CR	
Interleaved2of5	■	X	■	X	-	CR	
Code-93	■	X	■	■	-	CR	
Code-128	■	X	■	■	-	CR	
EAN-128	X	X	■	■	-	CR	
S-Code	■	X	■	X	-	CR	
MSI/Plessey	■	X	■CD1	■CD1	-	CR	
UK/Plessey	■	X	■	■	-	CR	
Telepen	■	X	X	■	-	CR	
Matrix2of5	X	X	■	X	-	CR	
Chinese Post Matrix 2of5	X	X	■	X	-	CR	
IATA	■	X	■	X	-	CR	
RSS-14	X	X	■	■	-	CR	
RSS-limited	X	X	■	■	-	CR	
RSS-expanded	X	X	■	■	-	CR	
PDF417	X	X	-	-	-	CR	
MicroPDF417	X	X	-	-	-	CR	
Code 11	X	X	X	■	-	CR	

Notes:

- In the "Reading" column, "■" means "Enable reading" and "**X**" means "Disable reading."

- In the "Transmit code length" column, "■" means "Transmit code length" and "**X**" means "Do not transmit code length."

- In the "Transmit CD" column, "■" means "Transmit check digit" and "**X**" means "Do not transmit check digit."

- In the "Calculate CD" column, "■" means "Calculate check digit" and "**X**" means "Do not calculate check digit".

10.3. Default Settings 2: Read Options, Trigger, Buzzer

Item	Default Setting
Setting the number of characters	Fixed length OFF all codes
Read mode	Multiple read
Multiple read reset time	500 ms
Add-on wait mode	500 ms
Multiple read	Disable multiple read
Multiple columns read	Disable multiple columns read
Redundancy	Read 1 times, redundancy = 0
Trigger switch	Enable trigger
Trigger repeat	Disable trigger repeat
Auto trigger	Disable auto trigger
Read time	2 seconds
Margin check	Margin check normal
Buzzer duration	50 ms
Buzzer tone	3 kHz (single tone)
Buzzer loudness	Maximum
Buzzer timing	Buzzer before transmission
Startup buzzer	Enable startup buzzer
Indicator duration	200 ms

11. Serial Number

The serial number as shown below is affixed to the scanner.

Figure 22: Serial number diagram

12. Packaging Specifications

12.1. Individual Packaging Specification

Put the scanner in a protective foam bag and place it in a single packing box.

The scanner shown is an RS-232C unit. Descriptions on an individual packaging box label differ, depending on the interface type. The "RO" mark may be indicated on the upper side of the individual packaging box label.

Figure 23: Individual packaging

12.2. Collective Packaging Specification

The scanner shown is an RS-232C unit. Descriptions on a collective packaging box label differ, depending on the interface type. The "RO" mark may be indicated on the upper side of the individual packaging box label.
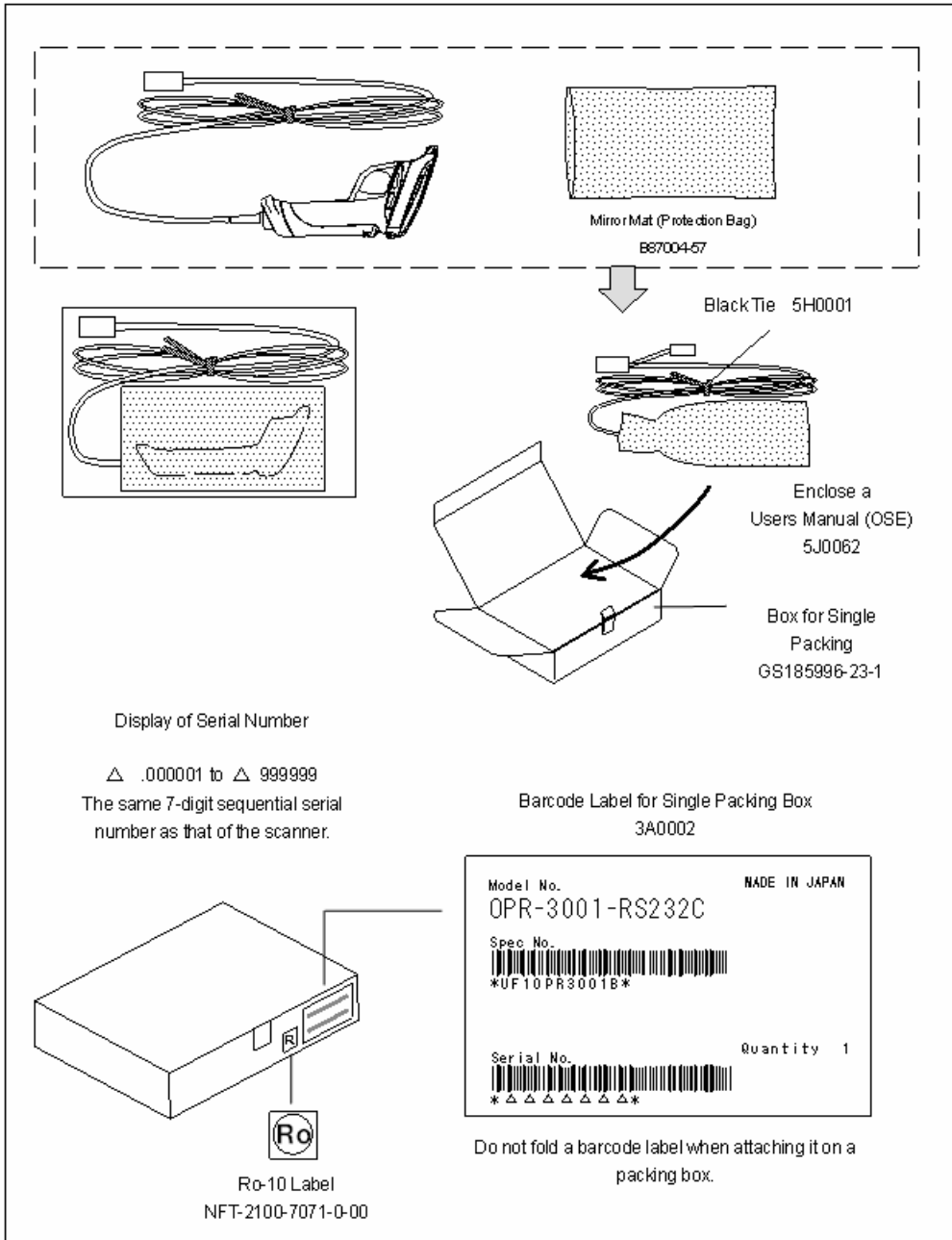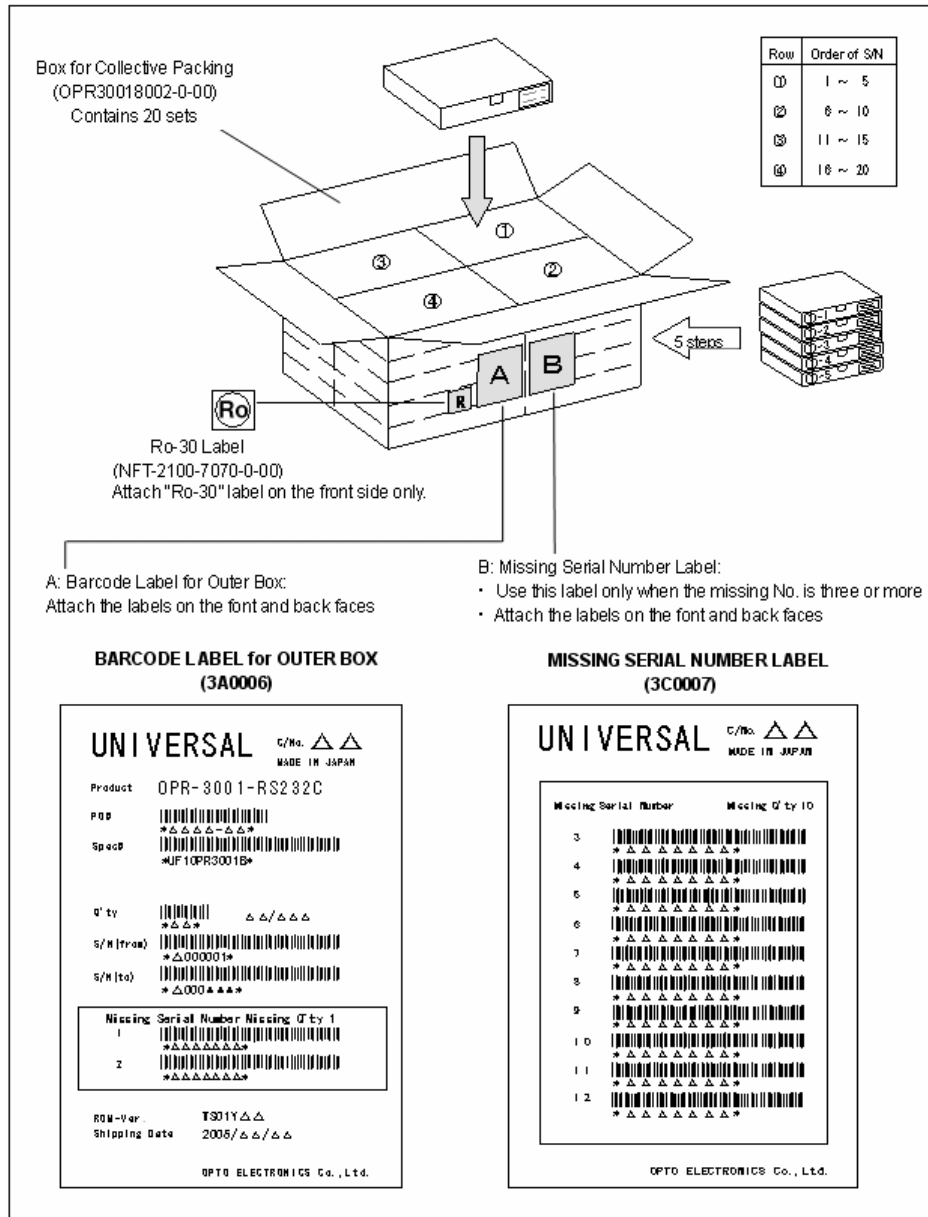

Figure 24: Collective packing

Note: The "RO" mark labeled on the package tray or package box guarantees that the applicable product has passed our test of RoHS restrictions compliance (the restriction of the use of certain hazardous substances in electrical and electronic equipment, 2002/95 EC). However, this document does not have any legal weight in the European Union.

13. Durability

13.1. Electrical Noise

No malfunction should occur when sinusoidal electrical noise (10Hz -100kHz, < 0.1Vpp) is added to a power supply line.

Conditions

Barcode Sample: OPTOELECTRONICS Test Sample

PCS:	0.9
Resolution:	0.25 mm
Symbology:	9-digit Code-39
Quiet Zone:	10 mm
N/W Ratio:	1:2.5
Distance:	100 mm from the edge of scanner
Angle:	α = 0° β = 15° γ = 0°
Curvature:	R = ∞
Power Supply Voltage:	6.0 V (RS-232C) / 5.0 V (USB and Wedge)

13.2. Static Electricity

Air discharge:	8 kV max (No malfunction)
	15 kV max (No destruction)
Contact discharge:	6 kV
	Contact discharge at the hook and the screw
Measurement environment:	Use electrostatic testing device compliant with IEC 61000-4-2
Discharge resistance:	330 Ω
Capacitor charging:	150 pF

13.3. Shock

13.3.1. Product Drop Test

No malfunction should occur after the following drop test.

As shown below, drop the scanner from 200 centimeters above the concrete floor (three times from each of 6 angles).
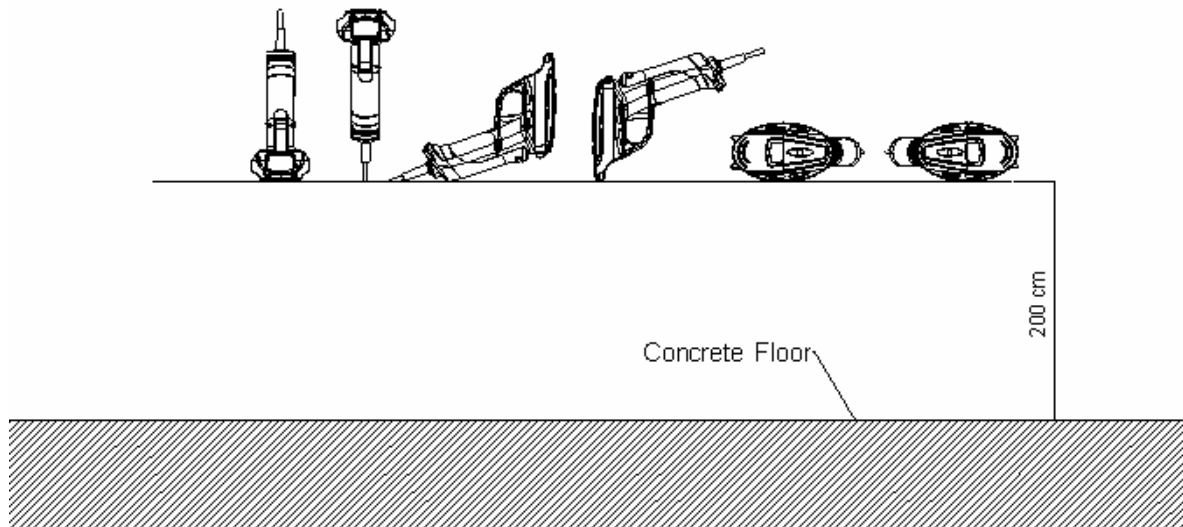

Figure 25: Product drop test

13.3.2. Shock: Individual Package Drop Test

No malfunction should occur after the following drop test.

Drop the individual package box from 150 centimeters above the concrete floor (ten times from random angles: on its top, bottom, front, back, left, right, top-left, top-right, bottom-left, bottom-right).

13.4. Vibration Strength

13.4.1. Vibration (without packaging)

Swept with 10 Hz to 100 Hz, acceleration 19.6 m/s^2 (2.0G). Added a vibration to each X, Y and X direction for 30 minutes (1 cycle = 60 minutes) under non-operational conditions. Observed no abnormality in either appearance or performance.

13.4.2. Vibration (individual packaging)

Swept with 10 Hz to 100 Hz, acceleration 19.6 m/s^2 (2.0G). Added a vibration to each X, Y and X direction for 30 minutes (1 cycle = 60 minutes) with individual packaging. Observed no abnormality in either appearance or performance.

13.5. Dust and Water Proof

IEC IP54

13.6. Cable Strength

13.6.1. Cable Pull Strength

Affixed the scanner to an immovable object and pulled it using a force of 49N (5.0 kgf) for 1 minute. Observed no abnormality in either structure or performance.

13.6.2. Cable Bend Strength

As shown below, added a load of 4.9N (500 g) to a cable then bent it at an angle of 90 degrees to both right and left. Count 1 time by bending to either side; repeated this 3 million times on RS-232C and Wedge cables and repeated 1 million times on USB cable. Observed no abnormality in either structure or performance. Note: Cable bending resistance is not warrantable.
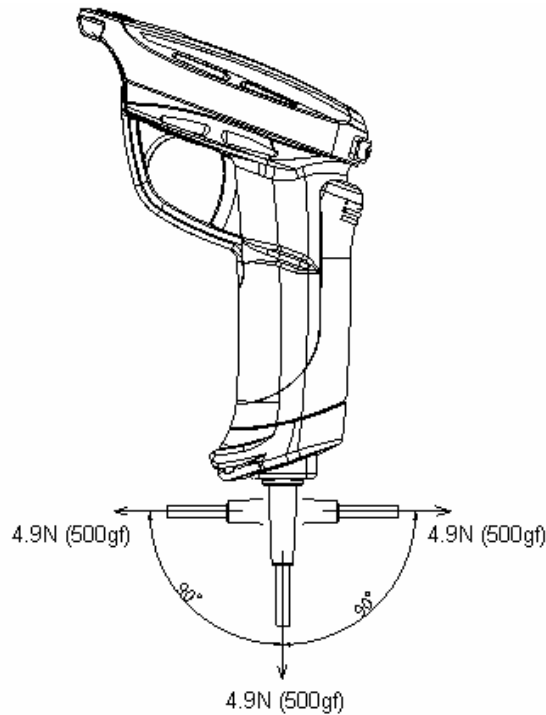

Figure 26: Cable bend strength

14. Reliability

MTBF (mean time between failures) of this product except for the laser diode and the mirror motor scan unit is 30,000 hours.

Life cycle of the laser diode is 10,000 hours and that of the mirror motor scan unit is also 10,000 hours.

The estimate of MTBF and product life cycle is based on standard operation of the product within the recommended temperature range and without extreme electronic or mechanical shock.

15. Auto Trigger (Option)

The OPR 3001 has an optional auto trigger setting, which starts barcode reading automatically by using sensor detection. When auto trigger is enabled, a laser beam is emitted and points to the auto trigger area. The scanner starts barcode reading after detecting reflection from the surface when the auto trigger is used.

Auto trigger distance: 40 mm from the edge of the scanner.

Conditions

|	
Moving Speed:	100 ±10 mm/s
Angle:	Skew angle, excluding pitch angle and dead zone
Environmental Temperature and Humidity:	Room temperature and humidity
Environmental luminance:	500 to 900 lx

Conditions for the auto trigger:	1. Barcode sheet: OPTOELECTRONICS Test Sheet (white)
	   Background: OPTOELECTRONICS Test Sheet (black)
	2. Barcode sheet: OPTOELECTRONICS Test Sheet (black)
	   Background: OPTOELECTRONICS Test Sheet (white)
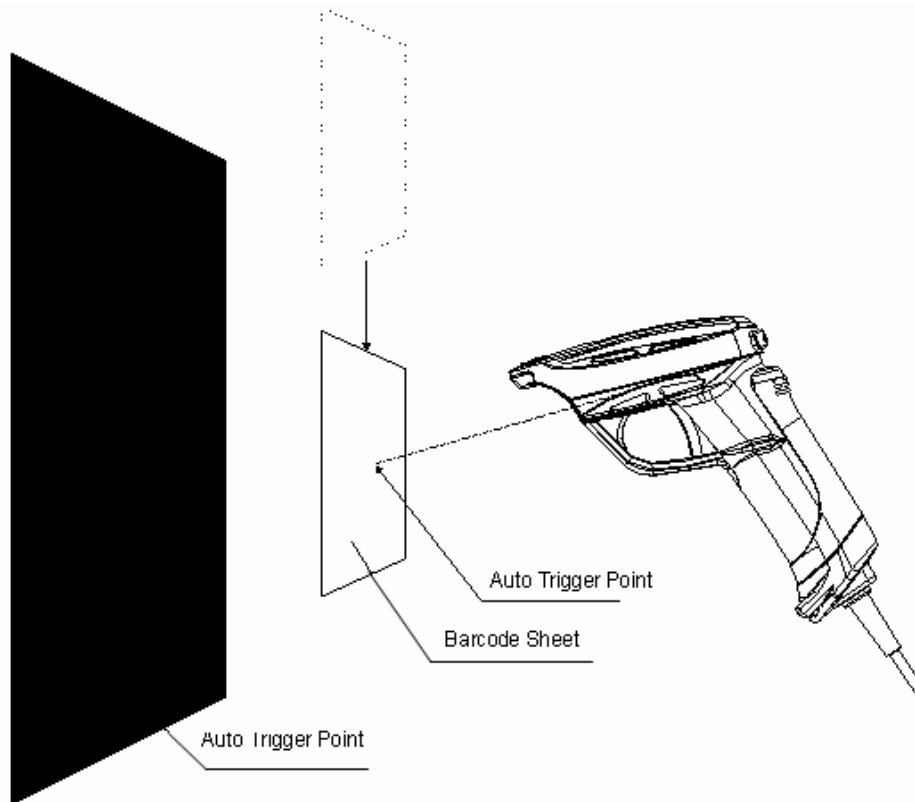
Figure 27: Auto trigger

15.1.1. Auto Trigger Settings

Functions	Menu labels	Menu codes
SET		ZZ
Disable auto trigger		+F
Enable auto trigger		+I
END		ZZ

16. Regulatory Compliance

16.1. Laser Safety

The scanner emits laser beams.

- JIS C6802: 2005: Laser class 1

- IEC 825-1/EN 60825-1: Laser class 1

- FDA CDRH Laser class I. Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50 dated July 26, 2001

Class 1 laser devices are not considered to be hazardous when used for their intended purpose. Avoid staring into the laser beam.

16.2. Product Safety

EN60950-1: 2001

IEC60950-1: 2001

16.3. EMC

EN55022

EN55024

FCC Part15 Subpart B Class B: This device complies with part 15 of FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

VCCI Class B: This is a Class B product, to be used in a domestic environment, based on the Technical Requirement of the Voluntary Control Council for Interference from Information Technology Equipment (VCCI). If this is used near a radio or television receiver in a domestic environment, it may cause radio interference.

16.4. RoHS

The restriction of the use of certain hazardous substances in electrical and electronic equipment, 2002/95 EC

17. Safety

17.1. Shock

- Do not throw or drop the scanner.

- Do not place heavy objects on the cables.

17.2. Temperature Conditions

- Do not use the scanner at temperatures outside the specified range.

- Do not pour boiling water on the scanner.

- Do not throw the scanner into the fire.

- Do not forcibly bend the cables at low temperatures.

17.3. Foreign Materials

- Do not immerse the scanner in liquids.

- Do not subject the scanner to chemicals.

17.4. Other

- Do not plug/unplug the connectors before disconnecting the power.

- Do not disassemble this product.

- Do not use the scanner near a radio or a TV receiver. It may cause reception problems.

- The scanner may be damaged by voltage drops.

- The scanner may not perform properly in environments when placed near a flickering light, such as a computer monitor, television, etc.

18. Mechanical Drawing
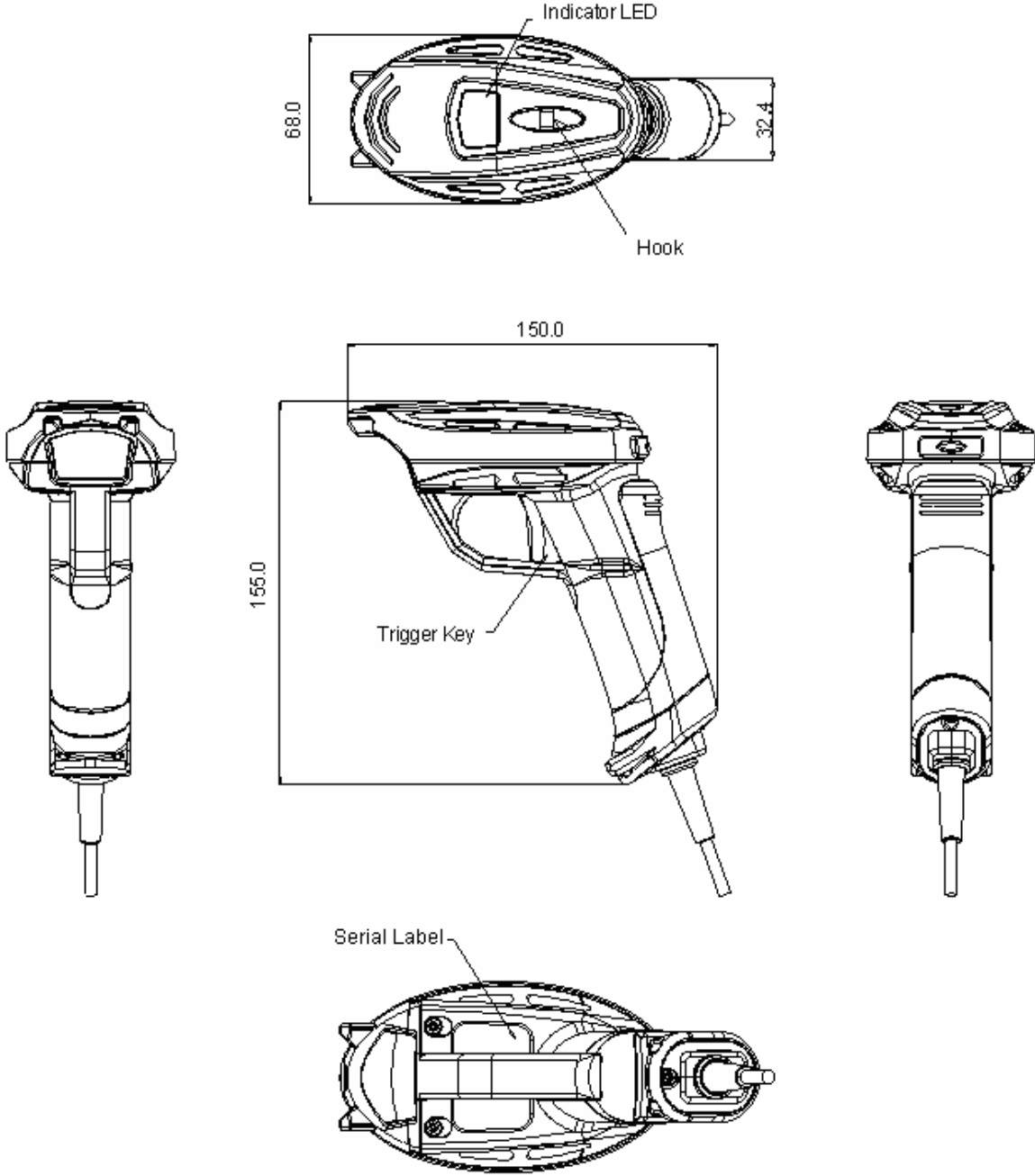
Dimensions: 3 W 68 X D 150 X H 155 (mm) (except protruding portion)

Figure 28: Mechanical drawing